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Modern Uses of Logic in Law: Quarterly Newsletter of the Electronic Data Retrieval Committee of the American Bar Association

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Contents 1960 March

			Page
1.	APPLICATIONS AND REPORTS ON RESEARCH		
	a. On the Existence and Linearity of Perfect Predictors in "Content Analysis"	Franklin M. Fisher	1
	b. Description of Briefs and Coding Program for Contracts Covering the Sale of Natural Gas in Interstate Commerce	John P. Furman	10
2.	LOGICAL THEORY		
	a. Deontic Logic	Layman E. Allen	13
3.	REVIEWS AND ABSTRACTS		
	a. The Order of Presentation in Persuasion	Lee Loevinger	28
4.	BIBLIOGRAPHY		
	a. Writings on Semantics and General Semantics for Lawyers	Walter Probert and Julius Paul	31
5.	PROBLEMS		
	a. Interpretation of California Pimping Statute		35
6.	READERS LETTERS AND OTHER MISCELLANEOUS ITEMS		
	a. Index of Oil and Gas Reporter	Robert A. Wilson	36
	b. Quality of Editorial Work	Ralph R. Neuhoff	36
	c. Problem of Relevance and Classification	Thomas A. Pace	37
	d. Unit-term Classification	Robert A. Marmet	37
	e. Uniform System of Indexing	Theodore F. Gardner	38
	f. Better Recording and Indexing	David P. Catsman	39
	g. Key Words in Law of Negligence	Grafton D. Rogers	39
	h. Problem of Characterizing Facts	Harold D. Cunningham	40
	i. Now You Take MULL for Example	Ward S. Bowman	41
	j. Documentation Research in Medicine	O. Nacke	43
	k. Netherlands Sales Tax Law	F. Paredies	44

MULL is published quarterly (Mar., June, Sept. and Dec.) by the Electronic Data Retrieval Committee of the American Bar Association. Edited by Layman E. Allen with the advice and assistance of Alan R. Anderson, Mary E. Caldwell, Patricia A. James, Harold D. Lasswell and Leon Lipson. Send manuscripts to: MULL 401A Yale Station, New Haven, Conn. Subscription rates: $1 for single copies, $2 for one year, $5 for three years.

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1. APPLICATIONS AND REPORTS ON RESEARCH

a. ON THE EXISTENCE AND LINEARITY OF PERFECT PREDICTORS IN "CONTENT ANALYSIS"

In 1957 Professor Fred Kort described a procedure for analyzing decisions of the United States Supreme Court in one area whereby

1. the factual elements that influenced the decisions are identified,
2. numerical values for these factual elements are derived by means of a "formula" and
3. on the basis of the derived values, the decisions of other cases in the area specified can be predicted.

The procedure recommended was exemplified by an analysis of 28 cases decided by the Supreme Court in 1932-1956 involving the issue of "right to counsel" under the Fourteenth Amendment.

See "Predicting Supreme Court Decisions Mathematically: A Quantitative Analysis of the 'Right to Counsel' Cases," 51 AM. POL. SCI. REV. 1 (1957).

In a critical evaluation of the Kort procedure Professor Franklin M. Fisher warned that misunderstanding and misemployment of otherwise sound technique could be ". . . especially harmful in a field where the application of mathematics is as yet in its infancy . . . because exposure of error may breed unjustified disenchantment or give solace to those who prefer a casual, imprecise impressionism in the social sciences."

See R1

Professor Kort's reply to Professor Fisher appears in the same issue of the American Political Science Review, and a revised proposal, entitled "Quantitative Content Analysis of Judicial Opinions" and using factor analysis, will soon be forthcoming. -- ED.

Some time ago, in my "The Mathematical Analysis of Supreme Court Decisions: the Use and Abuse of Quantitative Methods," (R1) I stated and illustrated, but did not give the proof of a theorem

connecting a rather weak consistency condition on the behavior of the Supreme Court with the existence of formulas predicting decisions. Recently, in discussing the proof of that theorem, I was greatly embarrassed to discover that the theorem is slightly incorrect as it stands. Although the correct version of the theorem necessitates no real change in anything else in my article -- in particular, not in my criticism of certain ways of proceeding -- I feel it desirable to correct the theorem in case anyone is interested in proceeding further along similar lines. Furthermore, the correction does carry an implication for empirical work.

I restate the problem briefly: each case is characterized by the presence or absence of n "factors", represented by variables:

$$x_1 \cdot \cdot \cdot x_n$$

which take on the value one when the relevant factor is present and the value zero otherwise. The factors are defined so that the presence of any factor strengthens or at least does not weaken the case of the original defendant. The question was raised as to under what circumstances a set of non-negative numbers:

$$a_1 \cdot \cdot \cdot a_n$$

would exist such that the sum:

$$a_1x_1 + a_2x_2 + \cdot \cdot \cdot + a_nx_n$$

would take on a higher value in any case decided for the original defendant (a "pro" case) than in any case decided against the original defendant (a "con" case). Another way of putting this is to ask under what circumstances a hyperplane (with non-negative coefficients) exists with the pro cases above and the con cases below it.

I stated (R1, pp. 325-26) that a necessary and sufficient condition for the existence of an infinite number of such hyperplanes was: "Condition 1: Suppose that we observe a pro case with a certain number, say F, of the factors present. Then we must never observe a con case with the same F factors present. (Whether or not other factors are present in the second case is irrelevant.)" This theorem was my "Theorem 1" and was interpreted in my paper. It is not correct as it stands; however, a somewhat weaker version does hold.

Suppose that instead of requiring the existence of a perfectly predicting hyperplane, we require only the existence of a (somewhat restricted) hypersurface with the pros above and the cons below it; that is, we seek the conditions under which a function:

$$G(X_1, \ldots, X_n)$$

will exist with the following two properties:

1) Fix all but one of the X_i and increase the remaining one from zero to one. Then G must not decrease and must actually increase with increases in at least one of the X_i.

The interpretation of this is the same as that of the non-negativity requirement on the a_i above. We require by it that our function reflects the fact that the factors are defined to favor (or at least not to be detrimental to) the original defendant.

2) G must have a higher value when evaluated at any pro point than at any con point.

The following theorem is correct:

Theorem A: Condition 1 is a necessary and sufficient condition for the existence of an infinite number of such functions.

Proof: a) Necessity: Suppose that G exists but that some con case, say

$$X^c = (X_1^c, \ldots, X_n^c)$$

and some pro case, say:

$$X^p = (X_1^p, \ldots, X_n^p)$$

exist with:

$$X^c \geq X^p$$

(i.e. all components of X^c are greater than or equal to the corresponding components of X^p). Then clearly, in view of the

first property of G:

$$G(X_1^c, \ldots, X_n^c) \geq G(X_1^p, \ldots, X_n^p)$$

contradicting the second property of G. (Incidentally, this shows that the necessity part of Theorem 1 was correct.)

b) Sufficiency: Consider the convex hull of the set of pro points, that is, consider the set of all points:

$$X = \sum_{j=1}^{P} w_j X^{pj}$$

where 1. $w_j \geq 0$,

2. $\sum_{j=1}^{P} w_j = 1$,

3. the X^{pj} are the points corresponding to the pro cases and

4. P is the total number of such points.

(In other words, we are considering points which are weighted averages of the points corresponding to pro cases.) Observe that no con case can lie in that convex hull (be such a weighted average); for, suppose it did, then consider only those pro points with non-zero weight in the average involved. Since the w_j are all positive, anywhere the con point has a zero, all such pro points have a zero; similarly, since the w_j sum to unity, anywhere the con point has a one, all the pro points must have a one. However, the con point only has ones and zeros; hence it must coincide with a pro point, contradicting Condition 1.

Thus no con point lies in the convex hull of the set of pro points. It follows immediately that a surface with the required properties is the lower boundary of that convex hull. Further, in view of the discreteness of the points corresponding to actual cases, if one such surface exists, an infinite number do.

Now, how does this differ from Theorem 1? Essentially, the difference is this: both theorems speak of ensuring the existence

of some perfectly predicting formula; however, the incorrect Theorem 1 asserts that some linear additive formula exists, whereas the true state of affairs is that Condition 1 only implies the existence of some formula (with appropriate properties) which may but need not be a linear one.

Fortunately, this difference affects almost nothing in my paper, certainly nothing of much importance. It remains true that practically nothing can be inferred from the attainment of a perfect predictor and that Condition 1 plus inspection can predict as well as anything else -- this being prediction from clear precedent. If cases can arise which the Court may distinguish from earlier cases, this kind of analysis cannot predict better than an intelligent lawyer reading the precedents.

The thing that does have to be changed is my unequivocal recommendation of discriminant analysis. There is now no guarantee that discriminant analysis (keeping a linear form) will succeed; however, it remains true that discriminant analysis is the best linear method to try, it has the desirable properties claimed in my article and is interpretable. Failure of discriminant analysis may mean, however, not that the Court was inconsistent but that a non-linear predictor is required. (If discriminant analysis does not predict perfectly, then no linear predictor will either.)

In this connection, my comment (R1, pp. 330-31) that there is no point in worrying about whether the "true" weights in the minds of the justices are linear or not is of course false. As the justices themselves state that they give more weight to certain factors (absence of counsel, consequences of plea of guilty not explained, etc.) when certain others are present (youth, illiteracy, inexperience, etc., or severity of punishment), there seems strong reason to believe that a non-linear form is required. The attainment of a perfect linear predictor is therefore of considerable interest (R2).

Unfortunately, while linearity itself can be interpreted as refuting the statement of the justices just referred to, I have been unable to establish necessary and sufficient conditions for linearity which have sensible interpretations in terms of the Court's behavior. For what it is worth, I give and explain such a condition:

Theorem B: A necessary and sufficient condition for the existence of an infinite number of perfect linear predictors (with non-negative coefficients) is that no convex (see proof of Theorem A)

combination of con cases has all coordinates greater than or equal to some convex combination of pro cases.

Proof: a) Necessity: Suppose that a perfect linear predictor did exist, but that the condition of the theorem were violated. Let the coefficients in the linear predictor be:

$$a_1, \ldots, a_n$$

Let the convex combination of con cases be X^{cO} and let the con cases themselves be represented by X^{cj}.

Then:

$$X^{cO} = \sum_{j=1}^{C} r_j X^{cj}$$

where 1. $r_j \geq 0$,

2. $\sum_{j=1}^{C} r_j = 1$ and

3. C is the total number of con cases.

Similarly, let X^{pO} be the convex combination of the pro cases which are themselves given by X^{pj}, so that:

$$X^{pO} = \sum_{j=1}^{P} w_j X^{pj}$$

where 1. $w_j \geq 0$,

2. $\sum_{j=1}^{P} w_j = 1$ and

3. P is the total number of pro cases.

Finally, let X^{p} be a pro case which is such that the value of the expression:

$$\sum_{i=1}^{n} a_i \bar{X}_i^{p}$$

is less than or equal to the value of the same expression for any other pro case; let $\bar{X}^c$ be a con case such that the value of that expression is greater than or equal to the value for any con case. Then, since the predictor is perfect,

$$\sum_{i=1}^{n} a_i \bar{X}_i^p > \sum_{i=1}^{n} a_i \bar{X}_i^c$$

However,

$$\sum_{i=1}^{n} a_i \bar{X}_i^c = \left(\sum_{j=1}^{C} r_j\right)\left(\sum_{i=1}^{n} a_i \bar{X}_i^c\right) = \sum_{j=1}^{C} \sum_{i=1}^{n} r_j a_i \bar{X}_i^c$$

$$\geq \sum_{j=1}^{C} \sum_{i=1}^{n} r_j a_i X_i^{cj} = \sum_{i=1}^{n} a_i \sum_{j=1}^{C} r_j X_i^{cj} = \sum_{i=1}^{n} a_i X_i^{c0}$$

and similarly,

$$\sum_{i=1}^{n} a_i X_i^{c0} \leq \sum_{i=1}^{n} a_i X_i^{p0}$$

But by supposition:

$$\sum_{i=1}^{n} a_i X_i^{c0} \geq \sum_{i=1}^{n} a_i X_i^{p0}$$

since the a_i are non-negative. Hence, we have:

$$\sum_{i=1}^{n} a_i \bar{X}_i^c \geq \sum_{i=1}^{n} a_i \bar{X}_i^p$$

which is a contradiction. The necessity of our condition here given implies the falsity of the sufficiency part of our original Theorem 1.

b) Sufficiency: The condition of the theorem means that the convex hull of the pro set and the convex hull of the con set have no points in common. It follows immediately that an infinite number of separating hyperplanes exist (R3) and the non-

negativity of the coefficients of some of them is obvious.

The meaning of the condition given may best be made clear by a parable which is by no means to be taken seriously.

Suppose that defendants were permitted to scramble their cases in the following manner: each one list whether a given factor is present or not in his own case on a slip of paper, the slips corresponding to a given factor are scrambled in a hat and a random drawing takes place. This is done for each factor and a case is made up to correspond to the slips drawn. (Note that some of the original cases may be identical.) The condition of the theorem states that no matter what the original cases were, a defendant wishing to win must not find it clearly preferable to draw from a set of hats filled with factors only from cases that would have lost rather than draw from a set of hats filled with factors from cases that would otherwise have won. To put it differently, no case which is an average of pro cases (i.e., in which each factor appears the "average" number of times, were this possible) can be clearly worse than a case which is an average of con cases, no matter how the original cases are selected.

Unfortunately, as stated, it does not seem possible to give Theorem B a sensible interpretation in terms of the Court's behavior (although this is not true of linearity itself). We must therefore be content with Theorem A, in which the interpretation of the condition is as in my original article, namely, that no con case is clearly better than a pro case -- that if clear precedents ever exist (and, if they don't, the condition is trivially satisfied), the Court follows them. This is a reasonable condition, given the Court's predilection for distinguishing rather than overruling precedent (R4).

Franklin M. Fisher
University of Chicago

REFERENCES

R1 52 AM. POL. SCI. REV. 321 (1958).

R2 It should not therefore be inferred that Kort's achievement is of this type. The attainment of a perfect linear predictor is no achievement when there are a large number of unobserved points on the boundary of the pro and con sets. Non-linearity is only important in dividing the two boundaries, not in separating the interiors.

Incidentally, I have refrained from comment on Kort's "Reply" 52 AM. POL. SCI. REV. 339 (1958). It should be clear, nevertheless, that I believe him to be quite wrong on all points of any substance.

R3 See Von Neuman, J. and Morgenstern, O. THE THEORY OF GAMES OF ECONOMIC BEHAVIOR 134 (3d Ed., 1953)

R4 I am indebted to J. D. Sargan and T. W. Anderson for discussion of the contents of this note.

b. DESCRIPTION OF BRIEFS AND CODING PROGRAM FOR CONTRACTS COVERING THE SALE OF NATURAL GAS IN INTERSTATE COMMERCE

Foster Associates, Inc. undertook to place on punched cards the significant details of contracts covering the sale of natural gas in interstate commerce. Such contracts, and all amendments to the contracts, are required to be filed with the Federal Power Commission as rate schedules. The contracts ordinarily contain a schedule of the prices to be paid in the future (typically, over a 20-year period) and detailed specifications as to the quantity of gas to be delivered, the quality of gas to be delivered, and the adjustments to be made in the scheduled prices under certain specified conditions.

Our original program was to place on punched cards the significant details affecting price for all contracts on file with the FPC as of a given date. As a first step in this program, a staff of natural gas specialists prepared summaries of the information appearing in the contracts and other filings with the FPC, using a two-page briefing form calling for the extraction of the most significant information contained in the contracts. The instructions for briefing ran to 11 single-spaced pages.

Despite the fact that the briefing instructions and the briefing form were prepared with care by a group of experts, it was found that there was frequent occasion to resort to long prose summaries of contract provisions, for the reason that the details in a particular contract would not be adequately provided for in the briefing form. At a later date, similar problems were encountered in coding the material on the briefing form for key punching. Because of the numerous "exceptional" cases, provision was made for a footnote code on the punched cards. Despite great efforts to limit the number of items coded as "footnotes", there were 27 pages of such footnotes when the original program covering some 7,000 contracts was completed.

A few examples will serve to illustrate the type of problem faced. While natural gas appears, off-hand, to be the most homogeneous of commodities, there are important variations in the conditions of sale (which could be expected to bear some relation to price). Some gas is delivered at the wellhead or elsewhere in the field where it is produced; such gas is sometimes called "raw" gas. In other cases, the gas may go to a gasoline plant and be processed for the extraction of liquids before the gas is delivered to the buyer; such gas is called "residue" gas. Our coding plan provided for separate identification of these two

types of sale (among others). However, there are some contracts where the gas is taken in the field by the buyer, delivered by him to a plant operated by a third party where liquids are extracted, and then redelivered to the buyer. We had the problem of classifying such sales as either (a) raw gas or (b) residue gas. Neither classification precisely "fits", but contracts of this type are not sufficiently numerous so that we were justified in setting up a separate classification code for them.

Another example of the difficulties encountered in classification arose from our desire to distinguish between amendments to the basic contract which revised the price schedule contained therein and changes in prices resulting from the operation of the provisions of the original contract. Many contracts provide that if the buyer enters into a contract at a higher price with any other seller he will pay the same price to the given seller; this is the so-called "favored nation" clause. When this occurs, the buyer ordinarily writes the seller a letter stating that he has entered into a contract at a higher price and will, effective from a given date, pay the higher price to the given seller. This is clearly a price change in accord with the original contract. In other instances the parties to the contract may amend their original agreement to introduce a complete new schedule of prices. The price change in this latter case is clearly based on an amendment to the contract. But, in some instances, where a price change could have been made in accordance with the terms of the original contract by means of a letter from the buyer to the seller, the parties to the contract instead negotiated a new price schedule in the form of an amendment to the original contract. The occasion for the amendment was the operation of the "favored nation" clauses in the original contract, but it happened to take the form of an amendment to the contract. In substance, this was a price change in accord with the provisions of the original contract but in form it was an amendment to the original contract.

As a result of our experience during the original program, we made extensive revisions to the briefing form and wrote substantially more detailed instructions for the use of the briefing analysts. We continue to consider it essential that the briefing be done only by qualified natural gas specialists. At the time we revised the briefing form, we also made the decision to limit the amount of material placed on punched cards. At present we use the punched cards mainly to provide identifying information on the contract together with a limited amount of information on price and other significant contract provisions. The availability of the punch cards makes it possible for us to select

quickly those contracts needed for detailed study. For such studies, however, we rely on the briefs of the contracts and frequently, we find that we need to go to the contracts themselves. For example: We record on the briefing form, in summary, whether the contract contains a "favored nation" provision or a "price redetermination" clause. (A price redetermination clause provides that at the end of a specified period of time the price will be redetermined by the parties to the contract; the clause may provide a rather precise basis for the redetermination or only general guidance.) This information is also recorded on the punched cards. Recently, we had occasion to study contracts containing such clauses. What was involved was a careful study of the language contained in each such clause. Our punch cards made it easy to identify those contracts which included "favored nation" or "redetermination" provisions. However, it was necessary to go to the contracts to obtain the information we needed as to the precise language of such clauses in given cases.

In conclusion, we have found:

1. The briefing of the contracts and, to a lesser extent, the coding must be performed by persons with some detailed knowledge of the subject matter with which they are dealing. This makes the process expensive.

2. Specifications must be drawn with great care.

3. Punched cards are useful mainly as a means of identifying contracts which may be studied in greater detail by use of the briefs of the contracts or the contracts themselves.

4. Finally, and perhaps most important, despite extensive experience in this field, we have not been able to anticipate future requirements with any great degree of success. We cannot know today what questions will present themselves as worthy of detailed study at some time in the future, and therefore we do not know whether the items we have selected for inclusion on the briefing form and the fewer items we have placed on punched cards are the ones in which we will eventually be most interested.

John P. Furman
Member of the D.C. Bar

2. LOGICAL THEORY

a. DEONTIC LOGIC

The system of logic called Deontic Logic (abbreviated DL) deals with prescriptive concepts, as contrasted with the descriptive concepts dealt with in most logical systems (R1). Anderson (R2, p. 45) has shown that the DL presented here is a sub-system of Alethic Logic (abbreviated AL, see MULL 59D2a). In DL certain relationships between symbols, which can be interpreted as indicating the concepts of violation, obligatory, forbidden, permitted, indifferent, compatible, incompatible and commitment, are specified.

The Finnish logician, von Wright, first satisfactorily formulated DL in 1951 (R3). In his version of DL the deontic (i.e., prescriptive) concepts were treated as operating on act-types. Thus, von Wright would say: "Smoking is forbidden" i.e., "Acts which are of the type called 'smoking' are forbidden " If the letter F is stipulated as indicating 'forbidden' and (S) is stipulated as indicating 'smoking', then the proposition indicated by the above statement could be indicated by F(S) . Similarly, P(B) would indicate: "Acts of type-B are permitted".

Anderson (R2, p. 29) has treated the deontic operators as having propositions as arguments, rather than act-types. Thus, Pp is treated as indicating: "The state of affairs described by p is permitted". If p is taken as representing the proposition expressed by the statement: "Lawyers practice law without studying modern logic " then Pp indicates: "It is permitted that lawyers practice law without studying modern logic" (R4).

In the formulation of DL presented here the deontic operators will have propositions as arguments as in the Anderson treatment. Although it is possible to formulate DL so that it is a sub-system of AL, that is not the way it will be formulated here. Instead, an axiom and seven definitions, along with a formation rule, (i.e., A1, D8-D14 and FR8) will be added to AL so that the FATD number of the formulation of DL presented will be F327-A1-T3.02231-D37777.

The axiom to be added deals with the concept indicated by the term 'violation'. A few informal comments may help to clarify what is meant by this term and why the particular axiom

adopted is appropriate. As used here the term 'violation' is intended to relate to a set of rules. There will be a violation when one or more of the rules has not been observed. Thus, when a rule is broken, there is a violation. When the driver of a car goes the wrong way on a one-way street, there is a violation of the rule that cars ought not to be driven in that direction on that street.

When any of the rules of a legal system is broken, there is a violation of that rule. Of course, a given violation may or may not be followed by punishment of the offender in the name of the community. There are many rules that are not enforced. However, one who violates one of the rules of a legal system does expose himself to coercion from official community authorities, even though it is not always the case that violators are punished.

In determining what axiom it is appropriate to adopt with respect to violation, it is useful to ask what the purpose of having a set of legal rules is. While there may be other purposes served, the one to which attention is called here is that of motivating (i.e., channeling) human behavior. A set of legal rules, together with appropriate sanctions to be imposed when the rules are violated, serves to help encourage the performance of desired acts and the avoidance of undesired acts. However, if a set of legal rules is to serve the purpose of motivating the behavior of individuals, it must be possible for a person to act in a manner that will not violate the rules and thus not expose him to deprivation. If it is impossible for him to avoid violating the rules, there will be no incentive provided by the set of legal rules to induce him to act one way rather than another, because no matter how he acts, he will be violating the rules and rendering himself vulnerable to deprivation. Therefore, it seems reasonable to assume that in any legal system:

Axiom 1. It is possible that it is not the case that there is a violation.

If $\underline{V}$ is stipulated as indicating the proposition expressed by the statement: "There is a violation", then the axiom can be indicated as follows:

A1 $M\sim\underline{V}$

In one of Anderson's formulations of DL the concept of sanction is used rather than the concept of violation (See R2,

pp. 31-34). There the axiom MN$\underline{S}$ (where $\underline{S}$ indicates: "There is a sanction") is assumed, rather than MN$\underline{V}$. In using "sanction" in formulating DL, Anderson is seeking to develop a theory for normative systems generally (e.g., chess, football, ethics, legal systems), rather than a theory just for legal systems in particular (R1, p. 10). In formulating DL here for use with respect to legal systems in particular, the use of 'violation' rather than 'sanction' commends itself for two reasons:

1. In law the word 'sanction' already has a usage referring to authorization as well as the usage that Anderson intends, i.e., referring to a detriment. This may tend to some confusion.

2. In law the falsity of an obligatory proposition does not always result in a detriment, but only in a conditional detriment. Official punishment for violation of a legal rule follows only when some authorized person presents the situation to an appropriate community decision maker for action.

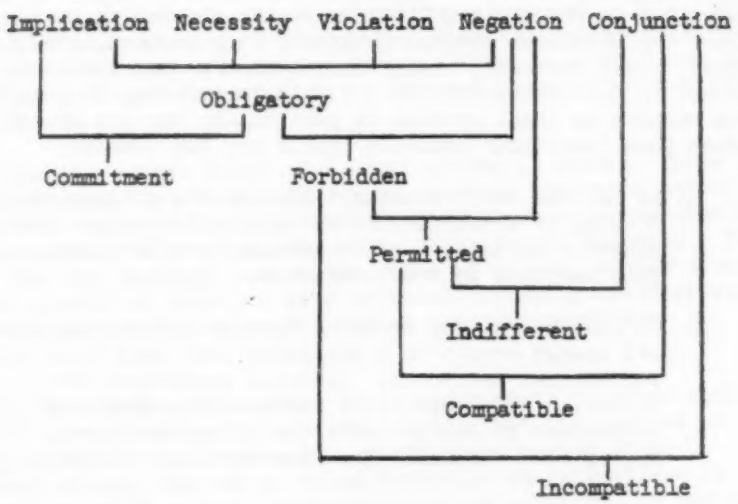
It, therefore, seems to this writer more appropriate to say that the breaking of a legal rule leads to a violation, rather than to say that it leads to a sanction; and to say that the violation may or may not lead to a sanction (in the sense of a detriment to the violator).

Since $\underline{V}$ is a primitive symbol in DL, it must, of course, be a member of the alphabet of DL. Also, there should be a formation rule which provides that certain strings of symbols containing $\underline{V}$ will be well formed. The appropriate formation rule is as follows:

FR8 $\underline{V}$ is a WFF.

Once Axiom 1, which introduces the concept of violation, is added to AL, then the other concepts of DL (i.e., obligatory, forbidden, permitted, indifferent, compatible, incompatible and commitment) can be defined in terms of violation and the concepts of AL. The relationship between the various definitions stipulated here is indicated in Figure 1. The concept of obligatory is defined in terms of implication, necessity, violation and negation; forbidden is defined in terms of obligatory and negation; etc.

Figure 1



In what follows there is given for each concept:

1. Definition Number
2. Notational Abbreviation of the Definition
3. Statement of the Definition in Notation
4. Informal Prose Description of the Definition

D8 Od

*_Ow
*¯
*¯LCNwV

Ow is equal by definition to LCNwV . (It is stipulated that to say that a proposition is obligatory is an abbreviated way of saying that it is necessary that if that proposition is false, then there is a violation.)

D9 Fd

*_Fw
*¯
*¯ONw

Fw is equal by definition to ONw . (It is stipulated that to say that a proposition is forbidden is an abbreviated way of saying that the negation of that proposition is obligatory.)

D10 Pd

*_Pv

*¯

* NFv

Pv is equal by definition to NFv . (It is stipulated that to say that a proposition is permitted is an abbreviated way of saying that it is not the case that that proposition is forbidden.)

D11 Id

*_Iw

*¯

* KPNwPw

Iw is equal by definition to KPNwPw . (It is stipulated that to say that a set of rules is indifferent with respect to a proposition is an abbreviated way of saying that it is permitted for that proposition to be false and it is also permitted for that proposition to be true.)

D12 C6d

*_C6vw

*¯

* PKvw

C6vw is equal by definition to PKvw . (It is stipulated that to say that a proposition is compatible with a second proposition is an abbreviated way of saying that the conjunction of that first proposition with that second proposition is permitted.)

D13 I2d

*_I2vw

*¯

* FKvw

I2vw is equal by definition to FKvw . (It is stipulated that to say that a proposition is incompatible with a second proposition is an abbreviated way of saying that the conjunction of that first proposition with that second proposition is forbidden.)

D14 C7d

*_C7vw

*¯

* OCvw

C7vw is equal by definition to OCvw . (It is stipulated that to say that there is a commitment that a second proposition be true if a first proposition is true, is an abbreviated way of saying that it is obligatory for that first proposition to imply that second proposition.)

The assumptions in this DL-F327-A1-T3.02231-D37777 formulation of Deontic Logic can be conveniently summarized as follows:

1. Alphabet — The same as for AL-F127-T3.02231-D177 with the addition of V as a propositional constant.

2. Formation Rules FR(1-3, 5, 7, 8) 1

3. Axioms A1

4. Transformation Rules TR(1, 4, 5, 8, 11, 16, 17) 5

5. Definitions D(1-14)

Recall with respect to AL that members of the following set of metatheorems (called the basic set of metatheorems) were provable:

Mi NLi NMi LAi LKi MAi ---
Mo NLo NMo --- LKo MAo MKo

The members of a similar set of metatheorems with respect to DL are also provable. The following will be called the basic set of metatheorems of DL:

Pi	permitted-in	Po	permitted-out
NOi	negation-obligatory-in	NOo	negation-obligatory-out
NPi	negation-permitted-in	NPo	negation-permitted-out
OAi	obligatory-disjunction-in	---	
OKi	obligatory-conjunction-in	OKo	obligatory-conjunction-out
PAi	permitted-disjunction-in	PAo	permitted-disjunction-out
---		PKo	permitted-conjunction-out

There are similarities between the concepts of AL and those of DL. Notice that, except for Pi , all the metatheorems about M of AL parallel the metatheorems about P of DL; and also, except for Po , all the metatheorems about L of AL parallel those about O of DL. Notice also a similar parallel with respect to the items not provable as metatheorems:

In AL:	In DL:
MKi is not provable.	PKi is not provable.
LAo is not provable.	OAo is not provable.

MT1 Pi — From KNMVw , it is valid to infer Pw .
* KNMVw — (If it is the case that both it is not possible that there is a violation and a proposition is true, then that proposition is permitted.)
* Pw

MT2 Po — From Pv and LCvw , it is valid to infer Pv.

* Pv
* LCvw
* Pv

(If one proposition is permitted and that first proposition necessarily implies a second proposition, then that second proposition is permitted.)

MT1 (Pi) Cl/2 KNMVw Pv

1*	KNMVw	s
2*	* Pv	s
3*	* ONv	2,Fd
4*	* LCNNvV	3,Od
5*	* CNNvV	4,Lo
6*	* v	1R,Ko
7*	* NNv	6,NNi
8*	* V	5,7,Co
9*	* NMV	1R,Ko
10*	* LNV	9,NMo
11*	* NV	10,Lo
12*	NFv	2-8-11,Ni
13*	Pv	12,Pd

MT2 (Po) Cl/2 Kl/2.LCvw.Pv Pv

1*	LCvw	s
2*	Pv	s
3*	* Pv	s
4*	* ONv	3,Fd
5*	* L* * NNv	s
6*	* * * Cvv	1R,Lo
7*	* * * v	5,NNo,6,Co
8*	* * * CNNvV	4,Od,R,Lo
9*	* * * V	7,NNi,8,Co
10*	* * CNNvV	5-9,Ci
11*	* LCNNvV	5-10,Li
12*	* ONv	11,Od
13*	* Fv	12,Fd
14*	* NFv	2R,Pd
15*	NFv	2-13-14,Ni
16*	Pv	15,Pd

MT3 NOi — From PNv , it is valid to infer NOv .

* PNv
* NOv

(If a proposition is permitted to be false, then it is not obligatory for that proposition to be true.)

MT4 NOo — From NOv , it is valid to infer PNv .

* NOv
* PNv

(If it is not obligatory that a proposition be true, then the negation of that proposition is permitted to be true.)

MT5 NPi — From ONv , it is valid to infer NPv .

* ONv
* NPv

(If it is obligatory that a proposition be false, then it is not permitted for that proposition to be true.)

MT6 NPo — From NPv , it is valid to infer ONw .

* NPv
* ONw

(If it is not permitted for a proposition to be true, then it is obligatory for that proposition to be false.)

MT3 (NOi) C1/2 PNw NOw

1* PNw	s
2* * Ow	s
3* * LCNwV	2,Od
4* * L* * NNNw	s
5* * * * CNwV	3R,Lo
6* * * * Nw	4,NNo
7* * * * V	5,6,Co
8* * * CNNNwV	4-7,Ci
9* * LCNNNwV	4-8,Li
10* * ONNw	9,Od
11* * FNw	10,Fd
12* * NFNw	1R,Pd
13* NOw	2-11-12,Ni

MT4 (NOo) C1/2 NOw PNw

1* NOw	s
2* * FNw	s
3* * ONNw	2,Pd
4* * LCNNNwV	3,Od
5* * L* * Nw	s
6* * * * NNNw	5,NNi
7* * * * CNNNwV	4R,Lo
8* * * * V	6,7,Co
9* * * CNwV	5,8,Ci
10* * LCNwV	5-9,Li
11* * Ow	10,Od
12* * NOw	1R
13* NFNw	2-11-12,Ni
14* PNw	13,Pd

MT5 (NPi) C1/2 ONw NPw

1* ONw	s
2* * Pw	s
3* * NPw	2,Pd
4* * Fw	1R,Fd
5* NPw	2-3-4,Ni

MT6 (NPo) C1/2 NPw ONw

1* NPw	s
2* * NFw	s
3* * Pw	2,Pd
4* * NPw	1R
5* Fw	2-3-4,Ni,NNo
6* ONw	6,Pd

MT7 OAi — From AOvOw , it is valid to infer OAvw .

* AOvOw
* OAvw

(If it is either obligatory that a proposition be true or it is obligatory that a second proposition be true, then it is obligatory that at least one of those two propositions be true.)

MT8 OAo — NOT PROVABLE

MT7 (OAi) C1/2 AOvOw OAvw

1*	AOvOw	s
2*	* Ov	s
3*	* LCNvV	2,Od
4*	* L* NAvw	s
5*	* * CNvV	3R,Lo
6*	* * Nv	4,NAo,Ko
7*	* * V	5,6,Co
8*	* LCNAvwV	4-7,Ci,Li
*		
9*	* Ow	s
10*	* LCNAvwV	similar to 2-8
11*	LCNAvwV	1,2-8,9-10,Ao
12*	OAvw	11,Od

MT8 The statement of OAo if it were provable would be:

From OAvw , it is valid to infer AOvOw .

It can be shown that:

(1) It cannot be proved that from OAvw , it is valid to infer AOvOw .

is the same as saying:

(2) It cannot be proved that from NPKNvNw , it is valid to infer NKPNvPNw .

which in turn, is the same as saying:

(3) It cannot be proved that from KPNvPNw , it is valid to infer PKNvNw .

And surely (3) is acceptable, for consider what is true of a normative system in which:

(4) It can be proved that from KPNvPNw , it is valid to infer PKNvNw .

Under (4) if:

(5) Both
a. Person-1 is permitted not to refrain from contracting with Person-2 to do act-X and
b. Person-1 is permitted not to do act-X
i.e., KPNpPNq .

then it would be valid to infer:

(6) It is permitted for both
a. Person-1 to contract (i.e., not to refrain from contracting) with Person-2 to do act-X and
b. Person-1 not to do act-X
i.e., PKNpNq .

Since the acceptance of (4) leads to such consequences, it seems preferable to reject (4) on intuitive grounds; and thus, accept (3). The acceptance of (3) is, in effect, the acceptance of (1). Thus, there is intuitive justification for the unprovability of OAo .

MT9 OKi — From KOvOw , it is valid to infer OKvw .
* KOvOw
* OKvw
(If it is obligatory that a proposition be true and also it is obligatory that a second proposition be true, then it is obligatory that the conjunction of those two propositions be true.)

MT10 OKo — From OKvw , it is valid to infer KOvOw .
* OKvw
* KOvOw
(If it is obligatory that the conjunction of a proposition and a second proposition be true, then it is obligatory for that first proposition to be true and also it is obligatory for that second proposition to be true.)

MT9 (OKi) C1/2 KOvOw OKvw

1*	KOvOw	s
2*	LCNvV	1,Ko,Od
3*	LCNvV	1,Ko,Od
4*	L* NKvw	s
5*	* ANvNw	4,NKo
6*	* * Nv	s
7*	* * CNvV	2R,Lo
8*	* * V	6,7,Co
*	*	
9*	* * Nw	s
10*	* * CNwV	3R,Lo
11*	* * V	9,10,Co
12*	* V	5,6-8,9-11,Ao
13*	LCNKvwV	4-12,Ci,Li
14*	OKvw	13,Od

MT10 (OKo) C1/2 OKvw KOvOw 1

1*	OKvw	s
2*	LCNKvwV	1,Od
3*	L* Nv	s
4*	* ANvNw	3,Ai
5*	* NKvw	4,NKi
6*	* CNKvwV	2R,Lo
7*	* V	5,6,Co
8*	LCNvV	3-7,Ci,Li
9*	Ov	8,Od
10*	Ow	similar to 3-9
11*	KOvOw	9,10,Ki

MT11 PAi

From APvPw ,
it is valid to infer PAvw .

* APvPw
* PAvw

(If it is permitted for a proposition to be true or it is permitted for a second proposition to be true, then it is permitted for that first proposition to be true or for that second proposition to be true.)

MT12 PAo

From PAvw ,
it is valid to infer APvPw .

* PAvw
* APvPw

(If it is permitted for a proposition to be true or for a second proposition to be true, then it is permitted for that first proposition to be true or that it is permitted for that second proposition to be true.)

```
MT11  (PAi)  C1/2 APvPv PAvv                                    1

  1* APvPv                s
  2* * Pv                 s
  3* * * FAvv             s                                     5
  4* * * ONAvv            3,Pd
  5* * * LCNNAvvV         4,Od
  6* * * L* NNv           s
  7* * *  * CNNAvvV       5R,Lo
  8* * *  * NNAvv         6,NNo,Ai,NNi                          10
  9* * *  * V             7,8,Co
 10* * * LCNNvV           6-9,Ci,Li
 11* * * ONv              10,Od
 12* * * Fv               11,Fd
 13* * * NFv              2R,Pd                                 15
 14* * NFAvv              3-12-13,Ni
   *
 15* * Pw                 s
 16* * NFAvv              similar to 2-14
 17* NFAvv                1,2-14,15-16,Ao                       20
 18* PAvv                 17,Pd

MT12  (PAo)  C1/2 PAvv APvPv

  1* PAvv                 s                                     25
  2* * NAPvPv             s
  3* * KNPvNPw            2,NAo
  4* * ONv                3,Ko,NPo
  5* * ONw                3,Ko,NPo
  6* * LCNNvV             4,Od                                  30
  7* * LCNNwV             5,Od
  8* * L* NNAvw           s
  9* *  * Avw             8,NNi
 10* *  * * v             s
 11* *  * * CNNvV         6R,Lo                                 35
 12* *  * * V             10,NNi,11,Co
   * *  *
 13* *  * * w             s
 14* *  * * V             similar to 10-12
 15* *  * V               9,10-12,13-14,Ao                      40
 16* * LCNNAvwV           8-15,Ci,Li
 17* * ONAvw              16,Od
 18* * FAvw               17,Fd
 19* * NFAvw              1R,Pd
 20* APvPv                2-18-19,Ni,NNo                        45
```

MT13 PKi NOT PROVABLE

MT14 PKo From PKvw ,
it is valid to infer KPvPw .

* PKvw
* KPvPw

(If it is permitted for the conjunction of a proposition with a second proposition to be true, then it is permitted for that first proposition to be true and also it is permitted for that second proposition to be true.)

Notice that PKi is the same metatheorem as (4) in the argument indicating the intuitive justification for the unprovability of OAo . Therefore, the unprovability of PKi can be intuitively justified on the same grounds that were offered to show that (4) is untenable.

MT14 (PKo) C1/2 PKvw KPvPw

1*	PKvw	s
2*	* ANPvNPw	s
3*	* * NPv	s
4*	* * ONv	3,NPo
5*	* * LCNNvV	4,Od
6*	* * L* NNKvw	s
7*	* * * CNNvV	5R,Lo
8*	* * * V	6,NNo,Ko,NNi,7,Co
9*	* * LCNNKvwV	6-8,Ci,Li
10*	* * ONKvw	9,Od
11*	* * NPKvw	10,NPi
	* *	
12*	* * NPw	s
13*	* * NPKvw	similar to 3-11
14*	* NPKvw	2,3-11,12-13,Ao
15*	* PKvw	1R
16*	NANPvNPw	2-14-15,Ni
17*	KPvPw	16,Kd

With the metatheorems in the basic set of DL available, the following theorems can be proved easily in DL.

T1 A PNv Pv
T2 C AOvOw OAvw
T3 C FAvv Pv
T4 C FNv Pv
T5 C FPv Fv

T6 C Fv FKvv
T7 C Fv FLv
T8 C Fv FOv
T9 C Fv OANvv
T10 C Fv OCvv

T11 C Fv ONKNvv
T12 C Fv PNv
T13 C Iv Pv
T14 C K.Fv.LCvv Fv
T15 C K.Fv.LCvOw Fv

T16 C K.Fv.Mv MV
T17 C K.Fv.OCvw Fv
T18 C K.KFvFv.LCuOAvv Fu
T19 C K.KFvFv.OCuAvv Fu
T20 C K:K.NPv.OCuAvv:NPv NPu

T21 C K.LCvv.Ov Ov
T22 C K.LCvOw.Ov Ow
T23 C K.LCvOw.Pv Pv
T24 C K.LCvv.Pv Pv
T25 C K.NMv.OCvv Fv

T26 C K.NPv.OCvv NPv
T27 C K.OCKuvv.Ou OCvv
T28 C K.OCvv.Ov Ow
T29 C K.OCvv.Pv Pv
T30 C LCvOw OCvv

T31 C Lv Ov
T32 C Lv Pv
T33 C NMv Fv
T34 C NPNv NPNPv
T35 C NPv NPNPNv

T36 C NPv ONv
T37 C NPv PNv
T38 C OAvv APvPv
T39 C OCNvv Ov
T40 C OOv Ov

T41 C Ov Mv
T42 C Ov OAvv
T43 C Ow OCvv
T44 C Ov OMv
T45 C Ov OPv

T46 C Ov Pv
T47 C PFv PNv
T48 C PKvv KPvPv
T49 C PNPNv Pv
T50 C PNPv PNv

T51 C POv Pv
T52 C Pv Mv
T53 C Pv PAvv
T54 C Pv PMv
T55 C Pv PPv

T56 E APvPv PAvv
T57 E C7vv NC6vNv
T58 E FAvv KFvFv
T59 E FNv Ov
T60 E Fv LCvV

T61 E Fv NPv
T62 E Fv ONv
T63 E KOvOw OKvv
T64 E LCNvV Ov
T65 E MKvNV Pv

T66 E NFv Pv
T67 E NONv Pv
T68 E NPNv Ov
T69 FV
T70 NK KFvFv OAvv

T71 NMK K.NPv.OAvv NPv
T72 OC Fv Nv
T73 OC Ov v
T74 OC v Pv

These theorems are arranged in the alphabetic order of their respective theorem patterns (See MULL 59S2all).

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R3 von Wright, G. H. "Deontic Logic," 60 MIND 1 (1951).

R4 In 1960 this happens to be a true statement everywhere, except in Poland; there symbolic logic is a required part of the curriculum in law schools.

R5 For additional References, see the items marked DL in the bibliography in MULL 5984.

3. REVIEWS AND ABSTRACTS

JURIMETRICS

a. The Order of Presentation in Persuasion, by Carl I. Hovland and others

(Yale Univ. Press, 1957)

This book is composed of eight papers reporting as many experimental studies of the effect of the order of presentation in determining the persuasiveness of argument. The experiments are concerned with both the problem of determining the effect of the order of presenting a series of communications, typically pro and con on a given issue, and also with the problem of the effect of the order of presentation of elements within a single communication.

The questions to which answers are sought are such practical ones as whether it is advantageous to present a communication before the opposition has an opportunity to reach the audience or afterward, in order to have the "last say". Is primacy or recency more important in securing persuasion? Similarly, if a single communicator is seeking to persuade, should he present familiar or unfamiliar, strong or weak points, rebuttal or assertive argument first?

The great significance to the forensic arts of answers to such questions is self-evident. However, the techniques of investigation will not be obvious to most lawyers, and there may even be skepticism that scientific experiments in relation to such problems is possible. For those who are skeptical as to the possibility of experiments in such a field this book should be a convincing answer; and for those who are interested it should be a provocative challenge. The experiments were, in fact, conducted with genuine scientific rigor.

The general design of the several experiments was of this character. First a topic for consideration was selected. Some of the topics used were: "Should all men have equal political rights?" "Is the protective tariff a wise policy for the United States?" "Should anti-histamines be sold without a prescription?" "Should the voting age be lowered from 21 to 18?" Then a scale measuring the positive or negative attitude of a subject to the topic was constructed and given to an experimental group. The experimental group was divided into two (or more) sections, and

a few days later printed material designed to persuade the subjects to take a particular view of the topic was presented to each section of the group. One section received printed argument favoring the affirmative side first, the other section received the negative argument first. Later each section received the opposing argument. Finally, the subjects were again tested on the same attitude scale. The results were then tabulated and analyzed statistically to determine whether there was any significant difference in the reaction of the subjects that correlated with the order of presentation of the arguments.

If primacy were an important element in the effectiveness of persuasion, then it would be expected that the subjects would tend to change their views toward the viewpoint which was first presented. If recency were more important, then the shift would be toward the viewpoint presented second. If one side of the argument were more persuasive than the other, this would be indicated by a general shift in both sections toward the viewpoint found most persuasive. If the arguments were evenly weighted and the effects of primacy and recency were about the same, then shifts would be random and not statistically significant.

Variations of these experiments were undertaken, by various experimenters, with verbal presentation of arguments, with "commitments" by the subjects through expression of opinion after the first presentation, and with variations of an expository, rather than hortatory, reading, after which the subjects were questioned as to their impressions. The results of these experiments are presented in technical statistical detail in tables throughout the book, and are analyzed in the discussion.

The authors do not claim results that give definitive answers to any of the questions investigated. There are tentative, and highly suggestive, conclusions drawn on a number of important aspects of the process of persuasion, although it is difficult to convey the qualified nature of these conclusions without indicating the various statistical measures on which the conclusions are based. But even at the risk of over-stating or misleading, it may be worthwhile to indicate some of the main findings.

In general, when two sides of an issue are presented successively by different communicators, the side presented first does not necessarily have an advantage. There is some evidence that the second communication may be slightly more persuasive. However, if a public response to indicate a po-

sition is made by a subject after hearing only one side of an issue, then the effectiveness of a subsequent presentation of the other side is reduced. When contradictory information is presented in a single communication by a single communicator, there is a tendency for the item presented first to dominate the impression received. First presenting the importance of information to the listener's needs or desires is more effective than presenting information and then attempting to show its significance to the listener.

It should be emphasized that none of these conclusions are regarded as completely established and that much work remains to be done in this field, both in refining the principles involved and in exploring other related problems. However, regardless of the specific conclusions reached, this work is of great importance to lawyers as well as to all others involved or interested in forensic fields. There is one conclusion that is not stated in the text although clearly assumed throughout. The models of experimental designs used in these studies and reported in these papers demonstrate with a clarity that should convince the most dubious that problems of this character can be experimentally investigated with scientific rigor and precision. Exploration of the full implications of this conclusion might well occupy lawyers, law schools and scholars for at least the next generation.

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47. "The Language of Law: A Symposium," 9 WESTERN RES. L. REV. 115-198 (1958), Contributions by Duffy, E. B.; Hayakawa, S. I.; Lasswell, H. D.; Loevinger, L., Probert, W.; and Schaefer, W. V.

Walter Probert
Florida Law School

Julius Paul
Wayne State University

5. PROBLEMS

a. INTERPRETATION OF CALIFORNIA PIMPING STATUTE

Conclusive evidence has been presented at the preliminary hearing to show that the defendant solicited a customer for a woman whom he knew to be a prostitute. Upon arraignment the defendant's counsel moved to set aside the information. The applicable statute reads:

> "Any male person who, knowing a female person is a prostitute, lives or derives support or maintenance in whole or in part from the earnings or proceeds of her prostitution, or from money loaned or advanced to or charged against her by any keeper or manager or inmate of a house or other place where prostitution is practiced or allowed, or who solicits or receives compensation for soliciting for her is guilty of pimping, a felony, ..."

Should the motion be granted? Is there any reasonable way of interpreting the statute so that the motion will be granted?

L.E.A.

6. LETTERS OF READERS AND OTHER MISCELLANEOUS ITEMS

a. INDEX OF OIL AND GAS REPORTER

"About a year ago we were faced with an extremely complex indexing problem involving the combining of 10 one-volume indexes to our Oil and Gas Case Reporter into a single master index. We called in the Dallas representative of the IBM Co. to see if their equipment could be of any help to us. After a thorough investigation, it was concluded that if the various subject headings could be incorporated on punched cards, the equipment would be a partial solution to our problem. However, the use of the standard 3 by 5 typewritten card method had progressed so far that a retransfer of the thousands of items to punched cards would have been prohibitively expensive and time consuming.

"However, the Research Section of the Southwestern Legal Foundation remains greatly interested in the potentiality offered by electronic equipment, and we will be most happy to cooperate in any way possible with you and the American Bar's Sub-Committee on Electronic Data Retrieval."

Robert A. Wilson
Southwestern Legal Foundation

b. QUALITY OF EDITORIAL WORK

"As I understand it, the characteristic of these electronic devices which is most useful to us is that they are so speedy that it is quite possible to run through a tape containing, for example, all of the words in a standard unabridged dictionary in a very short period of time, so short in fact that it is possible to search for a single word in this manner. I note the article which is extracted speaks of punch card machines and I am wondering whether when the project finally takes form it will not rely more upon tape recording of data than punch cards which are, as I understand it, a relatively slow method of operation. . . .

"It seems to me that no system of this kind will be any better than the editorial work and that the system should include some way of placing the contents of all legal articles on a memory tape as soon as they are published and this would include such things as ALR Notes. . . .

"One other suggestion is that no one is going to know how this works until it is actually tried and that it would be very

well to get started on a pilot system involving only a relatively small branch of the law such as patent law involving electronic machines. I mentioned this because it is a live subject now and, therefore, one would have a relatively large number of inquiries concerning a relatively restricted subject matter."

Ralph R. Neuhoff
Member of the Missouri Bar

c. PROBLEM OF RELEVANCE AND CLASSIFICATION

". . .[I]n line with the call for ideas in the American Bar News of Nov. 15, 1959, I give you one of my own conclusions for what it may be worth to you and the ABA Committee on Electronic Data Retrieval. It is based on my own modest amount of research in order to write the last six inches of my article in the ABA Journal for March 1959, 45 A.B.A.J. 264 at 307. . . . I am quite convinced that the next major step toward a solution of the problems of relevance and classification is to card punch the things recommended by Julius J. Marke in his perfectly wonderful article, "Future Plans for Legal Bibliographical Research," 7 J. Legal Ed. 530 (1955).

"There are many reasons for starting with Marke's suggestions, even though he made them without any reference to automatic data processing, which are readily apparent. They include a recognition of the likelihood of greater cooperation among government agencies as to pooling costs as well as efforts, and the fact that matters of classification and relevance are greatly simplified. If ADP works in the fields Marke recommends for conventional improvement, as I am reasonably sure it would, it will pave the way for the next push. Even coordinated private efforts and expenditures may be facilitated."

Thomas A. Pace
Falls Church, Va.

d. UNIT-TERM CLASSIFICATION

"Some years ago I had occasion to gain knowledge of a system of data retrieval known as documentation. The system was developed by a gentleman named Doctor Mortimer Taube. . . . His system was based upon the use of unit-terms. It impressed me that unit-terms were somewhat similar to our key words. Every case has a certain number of key words. It seemed to me that this was the most workable system to apply to the retrieval of a case in point at law."

Robert A. Marmet
Member of the District of Columbia Bar

e. UNIFORM SYSTEM OF INDEXING

"In the last issue of the American Bar News (November 15, 1959) there appeared an article entitled "WANTED: YOUR IDEAS ON 'KEY' TO ELECTRONIC LAW RESEARCH". In this article there is a statement "What is needed is a thorough-going analysis of the step-by-step method by which a lawyer locates precedents about which he has a personal recollection." My idea would be that in addition to perfecting a method of locating precedents about which the lawyer may have a personal recollection, it might be well, if the matter has not already been considered, to explore the matter also from the standpoint of the lawyer who is faced with a problem with which he is not familiar, or only vaguely familiar, and concerning which he has no knowledge or recollection of any precedent. The lawyer is accustomed to using orthodox methods of legal research to locate controlling precedents but he would like to have some form of automation accomplish the same result for him with a much less expenditure of his time and effort.

"The problem then, it seems to me, is to devise a mechanical system whereby all (or such part as he might desire) of the pertinent legal data bearing upon his problem will find its way into his hands, (or, more accurately, to his sight) quickly, economically, and in a form or medium in which it can be used to his best advantage.

"It is my feeling that no machine method of legal research can accomplish its maximum usefulness unless the lawyer having need of the information has some easy, efficient and readily available method of tapping the vast storehouse of legal knowledge. One approach to the "concept of relevance" would be to adopt a uniform system of classification embracing all kinds of legal material and if this were done the lawyer's familiarity with this system of classification would be the only "key" he would need to any kind of electronic law research which may be developed. Having analyzed his problem one could by using his "key" obtain the pertinent data from which he could select, and if possible reproduce, or otherwise retain for further reference, that which is useful to him.

"Even under present methods of legal research it occurred to me that it would be of considerable advantage to lawyers generally to have a uniform system of indexing which would be applicable to all legal materials used for purposes of reference or research."

Theodore F. Gardner
Member of the Ohio Bar

f. BETTER RECORDING AND INDEXING

"I am Chairman of the Improvement of Conveyancing and Recording Practices Committee of the Real Property Probate and Trust Law Section. Our project this year is the exploration of the use of electronic and mechanical means in recording practices. It seems that our committees should work together and supplement thinking along these lines.

"I note that one of the purposes of the News Letter is to stimulate lawyer thinking and suggestions for tackling the basic problems involved. I am struggling with this problem at the present time. It occurs to me that a study of the methods by which better recording practices and indexing could be achieved through electronic or mechanical means would be something that the industry itself would urge and sponsor.

"To date I have found no association which would represent all of the industries and have been unable to interest anyone of the companies in making such a study.

"Perhaps your Committee has paved the way along these roads."

David P. Catsman
Member of the Florida Bar

g. KEY WORDS IN LAW OF NEGLIGENCE

"The American Bar News calls attention to the fact that you are interested in obtaining ideas of attorneys as to ways in which legal materials can be put into such a form that they will be easily adapted to 'electronic law research.'

"I have been indexing decisions and points of law for many years and as far as the Law of Negligence is concerned I have found that certain key words are of invaluable help in locating decisions of the courts concerning the same points of law as are involved in the searcher's case and that these key words most often are those which designate the physical object or apparatus which is involved in the case. For instance, such words as STEPS, DOORS, WINDOWS, ELEVATORS, etc. Then the next sub-key-references under these key words are such words as CONSTRUCTION, LOCATION, OBSTRUCTION, LIGHTING, etc. The classification, AUTOMOBILES and similar machines where movement enters into the determination of negligence require additional key words such as,

RIGHT-OF-WAY, TURNING, BACKING, U-TURNS, etc. Then all of these key words require sub-key words such as those that indicate the persons involved, namely, - INVITEES, LICENSEES, TRESPASSERS, CHILDREN, DRIVERS or OPERATORS, PASSENGERS, etc.

"I am of the opinion that it would not be too difficult to work out a system as far as the Law of Negligence is concerned where use could be made of electronic machines to bring to the searcher the cases containing the relevant statements of the law applicable to the various facts presented to a lawyer in a particular case.

"Of course, I realize that the establishment of the key word system is only the beginning of the work which would be necessary to bring electronic machines to the aid of attorneys and considerable additional work would have to be done. However, in the meantime the working out of such a system would effect a better organization of the indexing and classification of the present sources of legal material. Certainly, the Law of Negligence, as well as other branches of law, need a much more practical system of indexing than is currently available."

Grafton D. Rogers

h. PROBLEM OF CHARACTERIZING FACTS

"I read with excitement a note in the American Bar News of 15 November 1959 concerning the publication of MULL and of the activities of the American Bar Association and interested lawyers and electronics experts in electronic law research.

"In the summer of 1950. . . I had the good fortune. . . to be briefed on the capabilities of electronic devices for recording personnel statistics and their potential for the law was immediately apparent. Though I have been unable to develop any ideas as to the practical application of data processing devices to legal research, my interest in this activity has continued.

"It seems to me that the problem here for the lawyer is essentially one of characterization. The source material of the lawyer is after all the sum total of official opinion concerning facts of legal significance. How shall he classify these facts and express them conceptually on a legal plane? He does not want to know how many cases presented the issue of contributory

negligence, or how many defendants succeeded with that defense, but rather how the contentions of facts giving rise to that defense vitiated other contentions of fact in the case and thus brought into play the resolving principle of law.

"In thinking about this problem, it might be profitable to adopt something akin to the institutional mentality of the lawyer in civil law jurisdictions, (See Lawson, "A Common Lawyer Looks at Civil Law," The Thomas M. Cooley Lectures, University of Michigan Law School (1953) p. 73, passim.) The common lawyer prides himself on his pragmatic reasoning from the particular to the general. But the law is only intelligible if viewed as a logical whole and the common law is far from complete. The civil law lawyer's willingness to work with general principles, to take an aesthetic delight in building the law into a logical synthesis is an attitude of mind that will, I believe, help reduce the grammar of the common law to manageable proportions."

Harold D. Cunningham, Jr.
Charlottesville, Va.

1. NOW YOU TAKE MULL FOR EXAMPLE

Mock Turtle: A Problem of Adjectival Ambiguity (See MULL 59D1a) has been inspirational. The inspiration is, I suppose, somewhat irreverent. Perhaps it is just an allergic reaction to the "big yellow rose."

". . .What I want to submit for much more serious consideration is the extreme adjectival ambiguity of the title of the publication itself: Mull, indeed!

Which of the "Mulls" are you, anyhow?

1. To mix up, to muddle? (Good God!)
2. To heat and spice as wine? (Happy New Year)
3. To ponder, to cogitate? (More might help)
4. To reduce to dust? (And spray with oil?)
5. To grind? (Surely not like gears)
6. To crumble? (Shades of Girl Scout cookies)
7. A thin, soft, cotton dress goods?
   And could you clear this up?
   a. thin-soft cotton dress goods

b. thin soft-cotton dress goods
c. thin soft cotton-dress goods
d. thin soft cotton dress-goods

or do you prefer Hyman Kaplan's version:

THIN* SOFT* COTTON* DRESS* GOODS*

8. An island in N.W. Argylshire, Scotland; the largest of the Hebrides group; pop. 5000?

9. That which one does to create a mullion? (Which as any schoolboy knows comes from the French word "moignon" meaning stump from which it is perhaps unambiguously evident that a mullion is a division between window-lights or panels.)

10. A confused state of affairs? (Now here is a kind of unambiguity which is clear)

Finally, I wonder if you heard about the fellow who followed a "noun" for months. When he finally made the grade they went for a ride. She left her "ems" and "ens" in his car. Fortunately she was both a compositor and a typist so you could say that in all probability she didn't mind. (In fact, you already have on p. 30.) Now, all I have left to say at this point is that you should admit as a "logical possibility" that a number of us may be in trouble!

Ward S. Bowman
Yale Law School

Query: Is there a difference between:

1. the kind of ambiguity to which Dean Montrose's article was addressed and

2. the kind of ambiguity Professor Bowman spoofs us about

with respect to the susceptibility of the two kinds of ambiguity to precise and rigorous control by a writer? --ED.

j. DOCUMENTATION RESEARCH IN MEDICINE

From our colleagues in medicine there is an announcement of the creation of a publication devoted to documentation and retrieval problems in medicine. -- ED.

Medizinsche Dokumentation

Journal for the General Methodology of Medical Information

The journal Medizinische Dokumentation (formerly Dokumentation in Medizin und Biologie) is concerned with the general rules of the verification, discovery, collection, and evaluation of publications of medical findings. This concern is exercised:

(a) directly through observation of the facts of a case
(b) indirectly through the statements made concerning the observation.

Medizinische Dokumentation, consequently, processes all the working steps that lie between the discovery of a medical fact and its publication; that is, it is concerned with:

Verification of medical findings
Understanding of medical findings
Collection of medical findings
Publication of medical findings
Theory of knowledge in medicine
Logic in medicine
Medical protocol system I
Medical protocol system II

Medizinische Dokumentation appears quarterly; the subscription rate is $5.00 per year. Anyone in the United States who is interested may have a free copy upon request provided:

(a) that the subscription price would have to be paid by him personally or
(b) that a billing through his supporting institution is not possible.

O. Nacke, M.D.
Abeitsausschuss for Medizin in Der Dgd.
Beilefeld, Stapenhorststrasse 62, Germany

k. NETHERLANDS SALES TAX LAW

I have read the essay of Miss P. A. James in MULL 59S about the ... [hypothetical French system of] sales taxes with great interest. I have examined the Netherlands laws on sales taxes and the proposed method can also be used there. (See Enclosure A)

Inasmuch as we must learn to be familiar with our neighbor's laws in the common market, it would be desirable to create a sister-organization to MULL in order to exchange experiences about laws that have been analyzed.

F. Paradies
Member of the Amsterdam,
Netherlands, Bar

TRANSLATORS OF FOREIGN LANGUAGES NEEDED

There are several articles and books written in foreign languages about the use of modern logic in law that would probably be of interest to readers of MULL. It would be helpful if abstracts or reviews of these in English were available. Readers of French, German, Italian or Polish who would be willing to undertake such a task for MULL, please volunteer your services. ---ED.

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Ann Arbor, Michigan
623

Citations to MULL

To keep citations brief, the following system will be used in making citations to MULL. Example: MULL 60M6c

60 Volume number -- coincides with year of publication
M Month of publication -- M March S September
J June D December
6 Section number
c Subsection number
Page number (if necessary)

The first issue of MULL appeared in September 1959.

Since one of the major purposes of MULL is to provide a vehicle for the exchange of information about

1. the uses of modern logic in law and

2. modern methods of information retrieval in law

readers are urged to send in news about research in progress that will be appropriate for inclusion in MULL.